

Vivek Kwatra

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Research page: *<http://www.cs.unc.edu/~kwatra/research.html>*

RESEARCH INTERESTS

Computer Graphics, Computer Vision, Machine Learning, Data-driven Techniques,
Image/Video-based Rendering, Physically based Simulation

EDUCATION

- 2005 **Ph.D., Computer Science**
GEORGIA INSTITUTE OF TECHNOLOGY – Atlanta, GA
Advisors: Dr. Aaron Bobick and Dr. Irfan Essa
Thesis: Example-based Rendering of Textural Phenomena
GPA: 4.0
- 2004 **M.S., Computer Science**
GEORGIA INSTITUTE OF TECHNOLOGY – Atlanta, GA
GPA: 4.0
- 1999 **B.Tech., Computer Science and Engineering**
INDIAN INSTITUTE OF TECHNOLOGY, DELHI – New Delhi, India
GPA: 8.74/10.00
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ACADEMIC & TEACHING EXPERIENCE

- 2005-Present **University of North Carolina, Chapel Hill** Chapel Hill, NC
POSTDOCTORAL RESEARCHER – Department of Computer Science
Working on fluid texturing, and the interaction between physically based simulation
and data-driven modeling.
- 2000-2005 **Georgia Institute of Technology** Atlanta, GA
GRADUATE RESEARCH ASSISTANT – GVU Center, College of Computing
Researched on human body-part tracking, compression of 2D cel animations, texture
synthesis for images and video, and video-based rendering of textural phenomena.
- 1999-2000 **Georgia Institute of Technology** Atlanta, GA
GRADUATE TEACHING ASSISTANT – Theory I
Graded homework assignments and exams, and helped students understand concepts
in graph theory, automata theory, and algorithms.

Summer 1997 **Indian Institute of Technology, Delhi** New Delhi, India
 UNDERGRADUATE RESEARCH ASSISTANT – Computer Science & Engineering
 Developed a toolkit for 3D animation using dynamic Binary Space Partitioning (BSP) trees.

INDUSTRIAL WORK EXPERIENCE

Summer 2002 **Mitsubishi Electric Research Lab. (MERL)** Cambridge, MA
 RESEARCH INTERN
 Worked on a video-based animation and rendering system.

Summer 2001 **IBM Research** Yorktown Heights, NY
 RESEARCH INTERN – T.J. Watson Research Center
 Developed a system for perspective-distortion removal (keystone correction) in a multi-surface projection system – part of the Everywhere Displays project.

Summer 1998 **HCL Perot Systems** Noida, India
 SUMMER INTERN
 Developed, in part, an Automated Testing System (ATS) used for recruiting new employees.

PUBLICATIONS

UNDER REVIEW

V. Kwatra, P. Mordohai, S. K. Penta, R. Narain, M. Carlson, M. Pollefeys, M. Lin, “Augmenting Real Video with Physically-based Simulation.”

REFEREED JOURNAL PUBLICATIONS

V. Kwatra, D. Adalsteinsson, T. Kim, N. Kwatra, M. Carlson, M. Lin, “Texturing Fluids,” *To appear in IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2007.

M. Johnson, G. J. Brostow, J. Shotton, O. Arandjelovic, V. Kwatra, R. Cipolla, “Semantic Photo Synthesis,” *Computer Graphics Forum (Proc. Eurographics 2006)*, 25(3), 2006.

V. Kwatra, I. Essa, A. Bobick, and N. Kwatra, “Texture Optimization for Example-based Synthesis,” *Proc. ACM Transactions on Graphics, SIGGRAPH 2005*, 24(3):795-802, August 2005.

V. Kwatra, A. Schödl, I. Essa, G. Turk, and A. Bobick, “Graphcut Textures: Image and Video Synthesis Using Graph Cuts,” *Proc. ACM Transactions on Graphics, SIGGRAPH 2003*, 24(3):277-286, July 2003.

V. Kwatra and J. Rossignac, “Space-Time Surface Simplification and Edgebreaker Compression for 2D Cel Animations,” *International Journal on Shape Modeling*, 8(2), 119-137, Dec. 2002.

REFEREED CONFERENCE PUBLICATIONS AND SKETCHES

R. Narain, V. Kwatra, H.P. Lee, T. Kim, M. Carlson, M. Lin, “Feature-Guided Dynamic Texture Synthesis on Continuous Flows,” *To Appear in Eurographics Symposium on Rendering (EGSR) 2007*.

V. Kwatra, D. Adalsteinsson, N. Kwatra, M. Carlson, M. Lin, “Texturing Fluids,” In *Technical Sketches Program*, ACM SIGGRAPH 2006.

W. Lin, J.H. Hays, C. Wu, V. Kwatra, and Y. Liu, “Quantitative Evaluation on Near Regular Texture Synthesis,” Proc. IEEE Conference on Computer Vision and Pattern Recognition Conference (CVPR) 2006, June 2006.

F. Dellaert, V. Kwatra, and S. M. Oh, “Mixture Trees for Modeling and Fast Conditional Sampling with Applications in Vision and Graphics,” Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2005.

G. J. Brostow, I. A. Essa, D. Steedly, and V. Kwatra, “Novel Skeletal Representation For Articulated Creatures,” Proc. European Conference on Computer Vision (ECCV 2004), May 11-14, 2004.

V. Kwatra and J. Rossignac, “Surface Simplification and Edgebreaker Compression for 2D Cell Animations,” Proc. International Conference on Shape Modeling and Applications (SMI 2002), 227-234, May 2002.

V. Kwatra, A. F. Bobick, and A. Y. Johnson, “Temporal Integration of Multiple Silhouette-based Body-part Hypotheses,” Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2001), II:758–764, Dec. 2001.

A. Kumar, V. Kwatra, B. Singh, and S. Kapoor, “Using Separating Planes between Objects for Efficient Hidden Surface Removal,” Proc. International Conference on Visual Computing (ICVC 1999), Feb. 1999.

A. Kumar, V. Kwatra, B. Singh, and S. Kapoor, “Dynamic Binary Space Partitioning for Hidden Surface Removal,” Proc. Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 1998), Dec. 1998.

THESES AND TECHNICAL REPORTS

V. Kwatra, D. Adalsteinsson, N. Kwatra, M. Carlson, M. Lin, “Texturing Fluids,” UNC Technical Report UNC-TR06-016, Department of Computer Science, UNC Chapel-Hill.

V. Kwatra, “Example-based Rendering of Textural Phenomena,” Ph.D. Thesis, College of Computing, Georgia Institute of Technology, August 2005.

W. Lin, J. Hays, C. Wu, V. Kwatra, and Y. Liu, “A Comparison Study of Four Texture Synthesis Algorithms on Near-Regular Textures,” Tech. Report CMU-RI-TR-04-01, Robotics Institute, Carnegie Mellon University, January, 2004. Also appeared in Poster Session SIGGRAPH, August 2004.

C. Pinhanez, R. Kjeldsen, T. Levas, G. Pingali, J. Hartman, M. Podlaseck, V. Kwatra and P. Chou, “Transforming Surfaces into Touch-Screens,” IBM Research Report RC22273 (W0112-016), Dec. 4, 2001.

A. Kumar and V. Kwatra, "Algorithms for Efficient Dynamic Hidden Surface Removal for Curved Surfaces," B.Tech Project Report, Department of Computer Science, IIT Delhi, May 1999.

HONORS & AWARDS

Outstanding Dissertation Award, College of Computing, Georgia Tech	2005-2006
Outstanding Graduate Research Assistant, College of Computing, Georgia Tech	2005
Member of Upsilon Pi Epsilon, International Honor Society	2003-Present
Merit Awards for being among the Top 20 in the Institute in IIT Delhi	1995-1999
Brilliant Tutorials Scholarship for securing All India Rank 5 in IIT JEE (Joint Entrance Examination)	1995
National Merit Scholarship (All India Level) for outstanding performance in High School	1993

COURSES

"Example-based Texture Synthesis," *To Appear* in SIGGRAPH 2007 Courses program. http://www.cs.unc.edu/~kwatra/SIG07_TextureSynthesis/

ADVISING

Currently co-advising the following students (at UNC-Chapel Hill):

- Rahul Narain, 1st year PhD (Feature-guided Fluid Texturing)
- Huai-Ping Lee, 1st year PhD (Feature-guided Fluid Texturing)
- Sashi Kumar Penta, 1st year PhD (Physically-based Editing of Real Videos)
- Paul Mecklenburg, 2nd year MS (Data-driven Fluids and Nearest Neighbor Search)

PRESENTATIONS

Guest lecture on texture synthesis in course on Computer Graphics, Department of Computer Science, UNC-Chapel Hill	Fall 2005
Invited speaker in IBM User Interface Technology Student Symposium	Nov. 2002
Guest lecture on texture analysis & synthesis in course on Computer Vision, College of Computing, Georgia Tech	Fall 2002
Guest speaker at Computer Vision Lab, IIT Delhi	April 2002

 MISCELLANEOUS ACTIVITIES

PROFESSIONAL

Completed Leadership Symposium, UNC Chapel-Hill June 2006

Poster Chair for the Workshop on Edge Computing Using New
Commodity Architectures (EDGE), Chapel Hill, NC May 2006

Reviewer for ACM SIGGRAPH, ACM SIGGRAPH Symposium on Computer Animation (SCA), IEEE Transactions on Visualization and Computer Graphics (TVCG), IEEE International Conference on Computer Vision (ICCV), IEEE Conference on Computer Vision and Pattern Recognition (CVPR), European Conference on Computer Vision (ECCV), Eurographics Symposium on Rendering (EGSR), Eurographics Computer Graphics Forum.

OTHER

Member of Graduate Student Committee, College of Computing,
Georgia Tech 2003-2004

General Secretary, Board for Recreational and Creative Activities,
IIT Delhi 1998-1999

 PROFESSIONAL ASSOCIATIONS

Member of Association for Computing Machinery (ACM) 2003-Present

 REFERENCES
Dr. Aaron F. Bobick (Advisor)

Chair, Interface Computing Division
Professor, College of Computing
Georgia Institute of Technology
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Dr. Irfan A. Essa (Co-advisor)

Associate Professor, College of Computing
Georgia Institute of Technology
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Dr. Ming C. Lin (Postdoc Supervisor)

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Dr. Dinesh Manocha

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Dr. Greg Turk

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